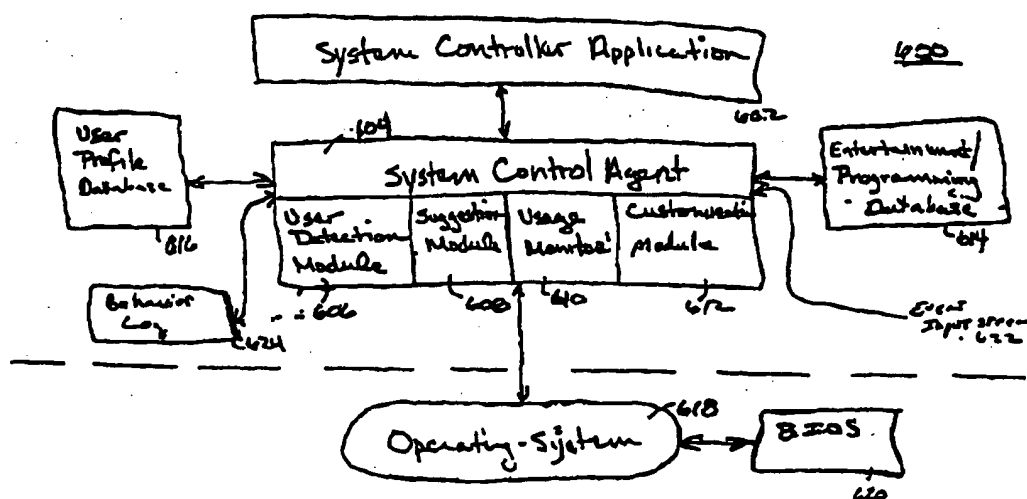




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : H04N 7/00, 7/10, 7/14		A1	(11) International Publication Number: WO 97/47135
			(43) International Publication Date: 11 December 1997 (11.12.97)
(21) International Application Number: PCT/US97/09178		(74) Agents: TAYLOR, Edwin, H. et al.; Blakely, Sokoloff, Taylor & Zafman LLP, 7th floor, 12400 Wilshire Boulevard, Los Angeles, CA 90025 (US).	
(22) International Filing Date: 4 June 1997 (04.06.97)			
(30) Priority Data:		(81) Designated States: AL, AM, AT, AT (Utility model), AU (Petty patent), AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).	
60/019,351 6 June 1996 (06.06.96) US 60/020,580 26 June 1996 (26.06.96) US 60/024,435 22 August 1996 (22.08.96) US 60/024,436 22 August 1996 (22.08.96) US 60/024,452 27 August 1996 (27.08.96) US 08/866,707 30 May 1997 (30.05.97) US			
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(54) Title: METHOD AND APPARATUS FOR AUTOMATICALLY DETERMINING AND DYNAMICALLY UPDATING USER PREFERENCES IN AN ENTERTAINMENT SYSTEM



(57) Abstract

A method and apparatus for automatically determining and dynamically updating user preferences in an entertainment system is provided. In a first embodiment, an apparatus comprises a storage medium (616) to store user preference information corresponding to at least a subset of a plurality of entertainment system users and a processor agent (604). The processor agent (604), communicatively coupled to the storage medium, is operative to monitor user interaction with the entertainment system and to automatically detect which user of the plurality of entertainment system users is currently using the entertainment system.

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**METHOD AND APPARATUS FOR AUTOMATICALLY DETERMINING
AND DYNAMICALLY UPDATING USER PREFERENCES IN AN
ENTERTAINMENT SYSTEM**

RELATED APPLICATIONS

This non-provisional application claims priority to provisional application no. 60/019, 351 by Jean Goldschmidt, Earl Watts and Kathleen Lane, for a Programming Preferences Agent Specification filed on June 6, 1996; provisional application no. 60/024,435 filed on August 22, 1996, for a Television Viewing Behavior Monitor by Jean Goldschmidt, Tony Shah, Christopher Williams and Kathleen Lane; provisional application no. 60/024,436 entitled Entertainment System Which Customizes Its Configuration To A Particular User, filed on August 22, 1996; provisional application no. 60/024,452 entitled Television Personalization, filed on August 27, 1996, by Jean Goldschmidt, Tony Shah, Christopher Williams and Kathleen Lane; and provisional application no. 60/020,580 entitled Customized Television Schedule With Suggested Viewing List, filed on June 26, 1996, by Jean Goldschmidt and Michael Watts. Each of the foregoing provisional applications are commonly assigned to Intel Corporation of Santa Clara, California.

BACKGROUND OF THE INVENTION

1. **Field of the Invention**

The present invention relates to the field of entertainment systems and, in particular, to a method and apparatus for automatically determining and dynamically configuring user preferences in an entertainment system.

2. **Background Information**

Numerous advances have been made in recent years in the field of entertainment systems. For example, programming guides are now prevalent on many cable systems throughout the country. In one embodiment, these programming guides are offered on a particular channel within the cable broadcast,

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and provide programming information for the next several hours. More advanced ones of these prior art systems may allow the user to interact with the program guide to manually select a particular program to record or view.

Another example of advances in entertainment systems has been the advent of parental control, wherein a person may "lock out" or require a password for channels that may be unsuitable for certain members of the family. Equally impressive advances have been made in audio devices, video recorders/playback devices, etc. A number of these devices allow a user to manually program the device to record a program given appropriate information regarding the program (channel, date, start time, end time, etc.). Other current systems allow a user to manually "add" and "erase" channels and thereby generate a preferred "channel surfing" order. For example, the user may erase channels 3 and 4 in order to pass directly from channel 2 to channel 5 when channel surfing. However, with these systems the channel surfing order must be manually programmed by a user and must be manually re-programmed by the next user if he or she desires a different order. That is to say, none of these prior art entertainment systems are capable of automatically determining which user is currently using the system and dynamically configuring the entertainment system in accordance with a user profile corresponding to the user.

Thus, a need exists for a method and apparatus for automatically determining and dynamically updating user preferences in an entertainment system.

SUMMARY OF THE INVENTION

In accordance with the teachings of the present invention, a method and apparatus for automatically determining and dynamically updating user preferences in an entertainment system is provided. In one embodiment of the present invention, an apparatus for use in an entertainment system is provided including a storage medium to store user preference information for at least a subset of a plurality of entertainment system users, and a processor agent. The processor agent, communicatively coupled to the storage medium, is operative to monitor user interaction with the entertainment system, and to automatically determine which user of the plurality of entertainment system users is currently using the entertainment system.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be described by way of exemplary embodiments, but not limitations, illustrated in the accompanying drawings in which like references denote similar elements, and in which:

Figure 1 is a block diagram illustrating a number of components making up an entertainment system in which the present invention may be practiced;

Figure 2 is a flow chart illustrating the steps followed in dynamically customizing system operating parameters corresponding to user preferences in accordance with one embodiment of the present invention;

Figure 3 is a flow chart illustrating the steps followed in determining which user of a plurality of system users is currently using the system according to one embodiment of the present invention;

Figure 4 is a flow chart illustrating the steps followed identifying programming information which might be of interest to a user according to one embodiment of the present invention;

Figure 5 is a block diagram illustrating an example computer system incorporating the teachings of one embodiment of the present invention;

Figure 6 is a block diagram illustrating the software elements according to one embodiment of the present invention;

Figure 7 illustrates a user profile database according to one embodiment of the present invention; and

Figure 8 illustrates a program database according to one embodiment of the present invention.

DETAILED DESCRIPTION

In the following description, for purposes of explanation, specific numbers, materials and configurations are set forth in order to provide a thorough understanding of the present invention. However, it will be apparent to one skilled in the art that the present invention may be practiced without the specific details. In other instances, well known features are omitted or simplified in order not to obscure the present invention. Furthermore, for ease of understanding, certain method steps are delineated as separate steps, however, these separately delineated steps should not be construed as necessarily order dependent in their performance.

Turning now to **Figure 1**, a block diagram is presented illustrating the system components of one example of an exemplary entertainment system in which the present invention may be practiced. As will be discussed in greater detail below system **100** includes system controller **104** which, in one embodiment, is configured to store user profile information which controller **104** develops for each of the users of system **100**. In addition, system controller **104** is configured to retrieve and store entertainment programming information available from a wide variety of sources. During operation of system **100**, system controller **104** automatically determines which user of a plurality of system users is currently using the system by comparing received inputs and current settings to at least a subset of the user profiles for at least a subset of the plurality of entertainment system users. Having determined which user of the plurality of system users is currently using the system, system controller **104** dynamically configures the operating parameters of system **100** in accordance with the user preference information of the user profile corresponding to the determined entertainment system user, and offers programming/entertainment suggestions, and a host of additional value added features to enhance the user's enjoyment of system **100**. In one embodiment, system controller **104** may be a computer system incorporated with the teachings of the present invention, as will be discussed in further detail below. In another embodiment, system controller **104** may be a "set-top" box endowed with the necessary processing power and incorporated with the teachings of the present invention. Regardless of the particular embodiment, system controller **104** may also be referred to as a "convergence system" designed to integrate the world of entertainment systems

and computing platforms to achieve the beneficial results discussed in greater detail below.

Although the present invention is described in the context of the exemplary embodiments presented in the figures, based on the descriptions to follow, those skilled in the art will appreciate that the present invention is not limited to these embodiments and may be practiced in a variety of alternate embodiments. Accordingly, the innovative features of the present invention may be practiced in a system of greater or lesser complexity than that of the system depicted in **Figure 1**.

As shown, **Figure 1** illustrates but one example of an entertainment system incorporated with the teachings of the present invention. In the illustrated embodiment, system **100** includes television/monitor **102**, video recorder/playback device **106**, digital video disk (DVD)¹ recorder/playback device **114**, audio/video tuner and amplifier **110**, audio playback/recorder device **122** and compact disk player **112**, all coupled to a common input/output (I/O) bus **108**. It is to be appreciated that the use of the common I/O bus **108** is for ease of explanation in the diagram only, and that a number of alternative means of routing input and output signals may be beneficially employed. For example, audio input and output could be routed with an appropriate number of independent audio "patch" cables, video signals may be routed with independent coaxial cable, and control signals may be routed along a two-wire serial line, or through infrared (IR) communication signals or radio frequency (RF) communication signals.

In addition, system **100** includes speaker system **116**, microphone **118**, video camera **120** and a wireless input/output control device **132**. In one embodiment, wireless I/O control device **132** is an entertainment system remote control unit which communicates with the components of system **100** through IR signals. In another embodiment, wireless I/O control device **132** may be a wireless keyboard and cursor positioning device that communicates with the components of system **100** through IR signals or RF signals. In yet another embodiment, wireless I/O control device **132** may be an I/R remote control device similar in appearance to a typical entertainment system remote control with the

¹DVD is currently used as an acronym for digital video disk. However, it appears that the usage is being changed to digital versatile disk to reflect the ability of DVD technology to be used for data other than video.

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added feature of a track-ball, which allows a user to position a cursor on a display of system 100.

At the core of the system is system controller 104 incorporated with the features of the present invention, configured to control a wide variety of features associated with each of the system components. As depicted, system controller 104 is coupled to each of the system components, as necessary, through I/O bus 108. In one embodiment, in addition to or in place of I/O bus 108, system controller 104 may be configured with a wireless communications transmitter (or transceiver), which is capable of communicating with the system components via IR signals or RF signals 108'. Regardless of the control medium, system controller 104 is configured to control each of the entertainment system components of system 100, although it is understood that each of the components may be individually controlled with wireless I/O device 132.

As illustrated in Figure 1, system 100 can be configured to receive programming input from a wide variety of sources. In one embodiment, for example, system 100 receives programming input from any or all of the following sources: cable broadcast 124, satellite broadcast 126 (e.g., via a satellite dish), very high frequency (VHF) or ultra high frequency (UHF) radio frequency communication of the broadcast networks 134 (e.g., via an aerial antenna), and/or the telephone/computer network interface 128. Further, it will be appreciated by one skilled in the art, that cable broadcast input 124, satellite broadcast input 126 and VHF/UHF input 134 may beneficially receive input from digital broadcast programming and digital cable programming. In addition to programming input, system 100 is also configured with a number of general purpose control outputs 130 which may be configured to control any number of devices. In one embodiment, for example, as system controller 104 configures system 100 to display a movie, it may also dim the lights in the room to a predetermined level to further enhance the viewing environment. Control circuitry which allows a computer system to control, for example, lighting, thermostat settings, and other household appliances are well known in the art and thus will not be described further. In another embodiment, system controller 104 analyzes programming content and configures system 100 to take full advantage of the programming. For example, if a television show is being broadcast in surround sound, system controller 104 determines that program is offered in surround sound and configures system 100 to display the television show in surround sound. If the

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next show televised on the network is not broadcast in surround sound, system controller **104** determines this and configures system **100** to display the television show in stereophonic or monophonic sound, as appropriate.

Except for the incorporated teachings of the present invention (to be more fully described below), system controller **104** is intended to represent a broad category of computer systems known in the art. An example of such a computer system is a desktop computer system equipped with a high performance microprocessor(s), such as the Pentium® processor, Pentium® Pro processor, or Pentium® II processor manufactured by and commonly available from Intel Corporation of Santa Clara, California, or the Alpha® processor manufactured by Digital Equipment Corporation of Manard, MA; a number of audio and video input and output peripherals/interfaces for receiving, digitizing and compressing audio and video signals are also known in the art. It is to be appreciated that the housing size and design for system controller **104** may be altered, allowing it to better visually fit into system **100**.

It is also to be appreciated that the several entertainment system components depicted in **Figure 1** can be beneficially combined. By way of example, system controller **104** could be integrated into television/monitor **102**, DVD **114**, or audio/video tuner and amplifier **110**.

Turning now to **Figures 2** through **4**, flow charts illustrating one embodiment of the method steps of the present invention for automatically determining which of a plurality of users is currently using the system, and automatically configuring the system in accordance with user preference information of the user profile is shown. For ease of explanation, and not limitation, the method of **Figures 2** through **4** will be developed in the context of an example implementation, wherein a user first begins using system **100**, step **202**. It is to be appreciated that system **100** provides a number of alternate means by which system **100** may be activated. In one embodiment, the user simply uses wireless I/O device **132** to begin watching television **102**. In one embodiment, the user is "surfing" the Internet via system controller **104** and a modem (not shown) coupled to telephone/network communications I/O **128**. Regardless of the means by which the user activates system **100**, system controller **104** determines which user of a plurality of known system users is currently using system **100**, step **204**. The method by which system controller **104** determines

which user of a plurality of users is currently using system 100 is described more fully below.

Having determined which user of a plurality of users is currently using system 100 in step 204, system controller 104 dynamically configures system configuration settings of system 100 in accordance with the user preference information found in the user profile corresponding to the identified user. Referring to Figure 7, depicted therein is one example of user profile database 700. In the illustrated embodiment of Figure 7, user profile database 700 contains information (user preference information) associated with each of the different media supported in system 100. For example, in the illustrated embodiment of Figure 7, user profile database 700 includes user preference information related to a television/monitor, a personal computer and audio components. As depicted, for television/monitor 102, user profile database 700 tracks user preferred channels, volume, program genre information, whether to block content information, and whether supplemental programming is requested with a particular channel. In the illustrated embodiment, for example, user profile database 700 includes a profile for the fictitious "Joe User". As illustrated, Joe User's favorite television channel is channel 2, which he enjoys viewing at a moderate volume; he prefers watching sports-type programming, no blocking is required, nor is any supplemental programming requested. With respect to channel 7, Joe enjoys watching movies available on this channel, at low volume, and he wishes to block violent movies. With respect to channel 11, Joe enjoys watching this station for its news coverage, at moderate volume, without the need for blocking, and Joe desires a "window" to be displayed on the television/monitor in which supplemental programming related to stock quotes are to be presented. In one embodiment, system controller 104 retrieves specific stock quotes customized to Joe's portfolio. In one implementation, system controller 104 retrieves the specific stock quotes from a predetermined world wide web site on the Internet via telephone/network interface 128. In an alternate implementation, system controller 104 retrieves general stock quote information from one of the broadcast network television channels. One skilled in the art will appreciate that in one embodiment, user profile database 700 may be stored locally in a storage medium found in system controller 104, while in alternate embodiments user profile database 700 may be stored remotely and accessed by

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system controller **104** through one of the many input ports of system controller **104**.

By way of additional examples, user profile database **700** includes information indicating Joe User's preferred computer settings, including preferred types of Internet sites (e.g., Games, Sports, and Financial), as well as preferred software applications (e.g., a clock and a birthday reminder application). User profile database **700** also includes information indicating Joe User's preferred audio component settings, including preferred radio stations and corresponding music types, as well as preferred listening volumes. In addition, user profile information may be beneficially used to tailor advertising to the current user of the system **100**. In one embodiment, for example, as the programming information is made available to system controller **104**, a wide variety of advertising segments may be downloaded which conform to the user profiles stored in a particular entertainment system. Accordingly, if system controller **104** determines that a child is using entertainment system **100**, it may restrict the advertising to breakfast cereal's and toys, whereas if the current user is an adult system controller may promote advertising for automobiles and home appliances. In another embodiment, system controller **104** may develop a customized news program, actively accumulating news stories that are particularly relevant or of particular interest to the current system user from any of the plurality of programming sources identified above.

It is to be appreciated that a wide range of configurable options can be monitored and stored in user profile database **700**. In addition to those illustrated in **Figure 7**, additional user preferences which may be stored in user profile database **700** include video controls such as sharpness, contrast, and brightness, audio controls such as surround sound processing types (including Dolby™ Surround, Dolby™ Digital, Dolby™ Surround Pro Logic, Dolby™ 3 Stereo, and THX™), various surround sound processing modes (including both number of channels and type of sound environment to emulate, such as concert hall, rock concert, movie theater, etc.), stereophonic mode, monophonic mode, closed captioning on/off, and preferred display layouts (e.g., window sizes and locations). Additional preference information may also be stored in user profile database **700**, including top ten favorite shows, most frequently watched/listened to source(s), most frequently watched/listened to channel(s)/station(s) per source, typical watching/listening periods, favorite genre(s), favorite commercial(s),

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favorite actor(s)/actress(es). For example, in one embodiment, system controller **104** determines which commercials a user favors by empirically recognizing which commercials get muted, or which commercials are interrupted (e.g., with a change of channel). In another embodiment, system controller **104** may determine which commercials are preferred by a particular user by eliciting feedback from the user whether the user liked the commercial, the commercial genre, etc. (e.g., through the use of an on screen prompt). In one embodiment, these configurable options for audio and video components are stored in user profile database **700** and referenced according to the media source of the signal (e.g., satellite broadcast). By way of example, the user's preferred video and audio settings may differ based on the source of a signal, such as the surround sound processing mode preferences of "concert hall" for one audio station, "rock concert" for a second audio station, and "movie theater" for one of the satellite channels.

In one embodiment of the present invention, user profile database **700** also stores default configuration options for each component. For example, a particular volume level, contrast setting, brightness setting, etc. for television/monitor **102** is stored and used by system controller **104** in the event different channel-specific preferences are not stored in user profile database **700**. By way of another example, a particular volume level and station setting for audio/video tuner and amplifier **110** is stored and used by system controller **104** in the event more specific preferences are not stored in user profile database **700**.

In one embodiment of the present invention, system controller **104** also provides a television schedule grid which displays the current channel selections for a predetermined period of time (e.g., the next two hours, week, or several weeks). The current program scheduling to be displayed is available from a programming database, as discussed in more detail below with reference to **Figure 8**. The display of this television schedule grid is a configurable option which can vary from user to user based on the user's preference. In one embodiment, the television schedule grid displays only those channels which user profile database **700** indicates the current user watches. Additionally, in one embodiment the ordering of the channels on the television schedule grid varies based on the user's preference. In this embodiment, user profile database **700** maintains a record of a users spends watching each television channel. Then, when system controller **104** receives a request to view the television schedule grid

(e.g., via the user's remote control) it displays the channels in the grid in the order of most frequently watched to least frequently watched. In an alternate embodiment, the television schedule grid displays the channels in the grid based on the genre of programming available during the displayed time period. For example, channel 2 may be Joe User's favorite channel, but if channel 8 is airing a football game while channel 2 is airing a documentary on the history of knitting (not high on the list of Joe User's genre preferences), system controller 104 will display channel 8 before channel 2.

In one embodiment of the present invention, selection of various programs can be made via the television schedule grid. In this embodiment, a user can select a particular portion of the grid by moving a cursor across the grid to a cell in the grid that contains the title of the program to be selected and then "clicking" the mouse button while the cursor is within the cell. System controller 104 can then ask the user whether the selected program is to be watched or recorded and display or record the program as requested by the user.

Returning to the example implementation of Figure 2, in parallel to configuring the system configuration of system 100 in step 206, system controller 104 continuously monitors the user interaction with system 100 to update and refine the user preference information stored in user profile database 700 in step 210. In particular, system controller 104 monitors and logs each of the user inputs received by the entertainment system (e.g., volume, color, supplemental programming, time logged on a particular web page, etc.) and updates the user preference information found in the appropriate records of the user profile.

It is to be appreciated that, in order to accurately monitor and log user inputs, system controller 104 needs to be made aware of the user inputs. In one embodiment, input signals (e.g., channel/station changes, volume changes, web page addresses, etc.) are input to system 100 via system controller 104, which in turn forwards control signals to the appropriate components to perform the desired function. In an alternate embodiment, inputs could be provided to different components of system 100 directly without going through system controller 104. In this embodiment, system controller 104 could receive control signals from the different components which identify the user inputs. Alternatively, in this embodiment system controller 104 could passively monitor wireless signals

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provided to various components of system 100, such as via wireless I/O device 132, in order to identify user inputs.

Once system 100 has been configured in accordance with the user preference information found in user profile database 700, system controller 104 scans the programming information found in a program database to identify programs which may be of particular interest to the user, based on the user profile, in step 208. The method in which system controller 104 provides appropriate programming suggestions will be described in further detail below. In one embodiment, the program database is part of system controller 104, and is updated periodically by accessing a remote server (not shown) via telephone/network communications 128 or via other mediums such as distributed diskettes or CD ROMs, a vertical blanking interval (VBI) of an analog video signal, or an additional data stream corresponding to a digital video signal (e.g., from a satellite system). In an alternate embodiment, the program database is located on a remote server (not shown), and system controller 104 accesses the remote server when necessary. One example of a program database, suitable for use in the present invention, is depicted in Figure 8. In the illustrated embodiment of Figure 8, program database 800 provides programming information corresponding to various media (cable, RF broadcast, satellite, audio programming, etc.), channels available in each medium, program time slots, and the genre of the program in each time slot. This information is then available for each day of the week (Monday-Sunday), and for each day of the month (1-31), as appropriate. For ease of explanation, program database 800 is depicted as a three-dimensional array, however, program database 800 could be implemented using any of a wide variety of conventional data structures.

It is to be appreciated that additional information (not shown) can also be stored for the various channels in program database 800. This additional information includes the length of the program, a program description/synopsis, actors/actresses, director, date of first airing or release, program genre, channel call-sign, rating, critique, etc.

Returning now to Figure 2, having provided programming suggestions, as appropriate in step 208, system controller 104 continues to monitor user interaction with system 100 until system controller 104 detects a new user, step 220. In the illustrated embodiment, system controller 104 continues to monitor

user interaction with system 100 and determine whether a new user is detected until system 100 is turned off.

Figure 3 illustrates the steps followed by system controller 104 in determining which of a plurality of system users is currently using system 100, in accordance with one embodiment of the present invention. In particular, Figure 3 illustrates steps 204 and 220 of Figure 2 in more detail, in accordance with one embodiment of the present invention. As depicted, the method begins with system controller 104 monitoring user interaction with system 100 and checking current system settings, step 302. This monitored user information is stored in a behavior log, as discussed in more detail below. In step 304, system controller 104 compares the information contained in the behavior log as well as the current system settings with user preference information for at least a subset of the plurality of entertainment system users. In one embodiment, the plurality of user profiles are stored locally, in system 100, and the entire user profile is used to determine which user is using the entertainment system. In an alternate embodiment, system controller 104 may load into a memory a select subset of user preference information for a first subset of the plurality of entertainment system users, and, if a match is not found, loads a subset of user preference information from a subsequent subset of the plurality of entertainment system user profiles until a match is found. Information available on the known system users is contained in a user profile database (e.g., user profile database 700) which may reside locally within system 100, or may reside at remote location. In one implementation, system controller 104 uses only that information in the behavior log which has been stored since the later of system controller 104 last being turned on and system controller 104 last identifying a particular user. In step 306, system controller 104 identifies whether the information of the behavior log matches that of the data for any of the known system users. In one embodiment, system controller 104 calculates a user metric for the information in the behavior log and the current system settings as well as for each of the known system users. If there is greater than a predetermined probability that the information in the behavior log matches the user profile of one of the known users, system controller 104 determines that a match has been made and, in step 308, configures system 100 in accordance with the user preference information of the user profile database 700.

In one embodiment, the user metric takes into account the current settings in system 100 for each user configurable option as stored in user profile database 700, such as television channel, current volume setting, current audio station, program genre, etc. It is to be appreciated that in order to identify some information, such as program genre, system controller 104 may need to access program database 800 of Figure 8 to identify which program and thus the program genre of the television channel currently being viewed. In other embodiments, this supplemental information may be provided in the broadcast itself as intercast information, or in the VBI.

To generate the metric, in one embodiment of the present invention, each of the configurable options is given a different predetermined weight and the weighted values are added together. By way of example, the television channel being viewed may be given a higher weight than the volume of the channel. This sum of weighted values is compared to a predetermined value and, if the sum exceeds the predetermined value, then the system controller 104 considers a match to be found. In one embodiment, the predetermined weights are dynamic, allowing the weight for a particular option to change as the duration of that option remains unchanged. For example, the weight of the television channel being viewed may be much higher if the channel has remained unchanged for a few minutes, indicating that a user is actually watching that channel, rather than if the channel changes every few seconds, indicating that a user is simply "flipping" through channels. That is to say, the weight given to the different configurable options is determined empirically over time, allowing system controller 104 to improve the accuracy of its ability to quickly identify which user is currently using system 100.

In one embodiment of the present invention, the user is prompted for verification of the match in step 306 by system controller 104. For example, system controller 104 may provide a window on television/monitor 102 wherein a number of pictures of possible system users are displayed, wherein the first picture displayed is that which system controller 104 has identified as the most likely system user, requesting that the user affirmatively respond (e.g., via remote control or voice command) when their picture is displayed; or alternatively, system controller 104 may provide an audio prompt in the form of a question, e.g., "Is that you, Joe?". If the match is verified as being accurate, then system controller

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104 proceeds to configure the system in step 308. Otherwise, system controller 104 returns to step 302 to continue monitoring user interaction with system 100.

In one embodiment of the present invention, system controller 104 allows the users to initially "train" the system with specific user preferences. This training allows the users to initially select some, or all, of their preferences. In one implementation, this training is through a direct input of specific options such as preferred channels, volume settings, program genre, etc. In an alternate implementation, the training of the system is done indirectly via an on-screen questionnaire(s), wherein the user is asked to select from a list of program genre (science fiction, sports, documentaries, etc.) that the user enjoys watching. System controller 104 then translates the responses to the questionnaire(s) to different configuration options available in system 100.

In one embodiment of the present invention, system controller 104 uses a pre-programmed default setting until a user match is found in step 304. In an alternate embodiment, system controller 104 uses "conservative" (e.g., low volume settings, display only non-blocked television channels, etc.) user preference options stored in user profile database 700 until a user match is found. For example, if parental controls are selected to block out several channels for one user but not for the other users, system controller 104 uses those parent controls as the default preferences until a user match is found.

In alternate embodiments of the present invention, different mechanisms may be beneficially employed to identify the current user of system 100 other than that described above. For example, in one embodiment the user of system 100 speaks into a microphone of system 100 (e.g., to activate system 100). System controller 104 compares the audio input from the user to pre-stored audio samples from the plurality of possible users and identifies which of the pre-stored samples is closest to the audio input to identify the user. One example of suitable audio recognition software is SpeakerKey, commonly available from ITT Industries of Fort Wayne, Indiana. Another suitable audio recognition development software is Speech Print ID, commonly available from Voice Print Systems of Dallas, Texas. In another alternate embodiment, a video image of the user of system 100 is scanned using one or more video cameras of system 100. System controller 104 compares the scanned image of the user to pre-stored visual scans of the plurality of possible users and identifies which of the pre-scanned images is closest to the scanned image of the current user to identify the user. One example of suitable

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US97/00257

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) :H04N 7/10

US CL :348/10; 455/6.2; 395/200.1

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : Please See Extra Sheet.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
STN-Derwent's World Patent Index (download?, config?, compat?)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,003,591 A (KAUFFMAN ET AL.) 26 MARCH 1991, FIGURES 1-6.	1-23
P,A	US 5,579,509 A (FURTNEY ET AL.) 26 NOVEMBER 1996, FIGURES 1-3.	1-23

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be part of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"A" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

21 MARCH 1997

Date of mailing of the international search report

16 APR 1997

Name and mailing address of the ISA/US
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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US97/00257

B. FIELDS SEARCHED

Minimum documentation searched

Classification System: U.S.

348/5, 6, 8, 9, 10, 11, 461, 465, 467, 468, 473, 475-479, 487; 395/200.1, 200.16, 200.17, 651, 652, 653, 187.01, 712; 455/ 3.1, 3.2, 3.3, 6.1, 6.2, 6.3; H04N 7/10